

0578

## REPORT DOCUMENTATION PAGE

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0108), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED Final 15 Jul 97 to 14 Mar 98	
4. TITLE AND SUBTITLE  Simox Evaluation Program		5. FUNDING NUMBERS  62228D 4276/AS	
6. AUTHOR(S)  Dr Bhar			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  University of District of Columbia Room 515 (MB 4810) Bldg 48 4200 Connecticut Avenue NW Washington DC 20008		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  AFOSR/NE 110 Duncan Aven RmB115 Bolling AFB DC 20332-8050		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT  APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  The equipment bought under this project is used to study the reliability of devices fabricated on SIMOX substrates. SIMOX (separation-by-implantation-of-oxygen) material is used primarily for low power IC application. The reliability of devices fabricated on SIMOX substrates is influenced by oxide degradation due to charge trapping, interface state generation, and bulk trap generation in SIMOX.			
14. SUBJECT TERMS		15. NUMBER OF PAGES	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED		18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED
		20. LIMITATION OF ABSTRACT  UL	

19980824 021

FINAL TECHNICAL REPORT  
ON  
SIMOX EVALUATION PROGRAM  
(Grant #F49620-97-0516)

Submitted to  
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH /NE  
110 Duncan Avenue Room B115  
Bolling AFB DC 20332-8050

BY  
Dr. Tarak Bhar  
Dept. of Arch. Engr. and Tech.  
University of the District of Columbia  
4200 Connecticut Avenue NW  
Washington DC 20008

FINAL TECHNICAL REPORT ON  
SIMOX EVALUATION PROGRAM

Period Covered: 15 July 1997- 14 March 1998 (including two months extension)

A. The "SIMOX (separation-by-implantation-of-oxygen) Evaluation Program" funded by AFOSR/NE is intended for acquisition of scientific equipment to do research on the evaluation of SIMOX material by avalanche injection technique. Due to unavoidable circumstances in the DC government approval process (Exhibit 1), the specified period of the project was extended for an additional two months ending on 14 March 1998

B. The following is a list of equipment acquired under the project:

1. Keithly Instruments Inc. (Exhibit 2)

C/O Technical Representatives  
PO Box 5176  
Cleveland, OH 44190

Date of Order: 02/17/98

Equipment bought:	Cost:
1 Model 82 Win C-V System	\$28,722.99
1 Model 237 SMU	5,756.40
1 Test Point Software Package	895.50
1 Model 7001 80 Channel Switch System	1,705.50
1 Model 7153 4X5 H/V Low Current Matrix Card	2,308.50
2 Model 7153 TR X Low Noise Cable	1,215.00
4 237-BNC-TRX3 Lug Female Triax to Male BNC Adapter	<u>342.00</u>
Subtotal:	\$40,945.89

2. Manufacturer: Hewlett Packard Company (Exhibit 3)

2101 Gaither Road  
Rockville, MD 20850

Date of Order: 02/14/98

Equipment bought:	Cost:
1 Model 3245A Function Generator	\$4,545.00
1 Option 002 10 X High Voltage Amplifier	<u>1,431.00</u>
Subtotal:	\$5,976.00

2. Manufacturer: COMP USA (Exhibit 4)

8357 Leesburg Pike

Vienna, VA 22182

Date of Purchase: 03/13/98

Equipment bought:	Cost:
1 HP 8275 PII 300 48/8 Computer	\$1,924.97
1 HP 17.28 M70 MM Monitor	624.97
1 HP Deskjet 722C	274.97
1 CUSA CBL Gold IEEE #128V	34.99
1 PNY 32 MB SDRAM	<u>129.99</u>
Subtotal:	\$2,989.89
<b>Total:</b>	<b>\$49,911.78</b>

C. The following is a list of changes to the equipment listed in the proposal:

Model 5958 Software	} is replaced by -	237 High Voltage SMU
Model 6157 Electrometer		Test Point Software Package
Model 7058 Switch Card		7153 Matrix Card
(All from Keithly Insts)		7153 Low Noise Cable
		237 Female to Male Adapter
		(All from Keithley Insts)

D. The equipment bought under this project is used to study the reliability of devices fabricated on SIMOX substrates. SIMOX (separation-by-implantation-of-oxygen) material is used primarily for low power IC application. The reliability of devices fabricated on SIMOX substrates is influenced by oxide degradation due to charge trapping, interface state generation, and bulk trap generation in SIMOX BOX. Also, the SIMOX BOX must be radiation hardened for defense and space applications. It is therefore necessary to precisely determine and control the densities and cross-sections of electron and hole traps in the BOX. Avalanche injection of charge is used to fill traps. High frequency capacitance-voltage (C-V) curves is used to measure and characterize the trapped charge.

University of the District of Columbia

Office of Grant Administration, MB 4810  
4200 Connecticut Avenue, N.W.  
Building 48 Room 515, Washington, D.C. 20008.  
Telephone (202) 274-5597 Fax (202) 274-5264



December 3, 1997

Ms. Jennifer L. Bell  
Post Award Specialist  
U.S. Air Force Office of Scientific Research  
110 Duncan Avenue (Room B115)  
Bolling Air Force Base  
Washington, D.C. 20332-8050  
(Re:F49620-97-0516)

Dear Ms. Bell:

We refer to the currently awarded AFOSR grant, reference number F49620-97-0516, entitled, "Simox Evaluation Program". The University has experienced innumerable delays in getting the grant's spending authority established, relative to FY-1998, in the D.C. Government's Management System. These delays have materially affected our ability to successfully order and subsequently pay for the equipment specified in the grant. Therefore, a change in the grant's ending date, until March 14, 1998, is hereby requested.

Please feel free to contact me (on 202-274-5263) or Dr. Bhar, the project director (on 274-5836) concerning this matter.

Yours truly,

Mr. L.H. Barnes  
Director, Grant Administration

Dr. Tarak Bhar  
Project Director



GOVERNMENT  
OF THE  
DISTRICT OF COLUMBIA

EXHIBIT 2.

PURCHASE ORDER

**FAXED**  
2/12/98

MO DY YR DATE OF ORDER 02 17 98		PURCHASE ORDER ID TRAN CODE PC TRAN NUMBER ORD00018419		TERMS	ORDER PLACED IN ACCORDANCE WITH ALL PROVISIONS OF UDC PROC. REG. CONTRACT NO. QUOT. INVITATION NO. DATED					
TO VENDOR	TYPE C A 00419041900			VENDOR CODE OH 44190						
	NAME: KEITHLEY INSTRUMENTS, INC. ADDRESS: C/O TECHNICAL REPRESENTATIVES PO BOX 5176 CLEVELAND			ALL CHARGES PREPAID TO: UNIVERSITY OF DC 4200 CONNECTICUT AVE N.W. WASHINGTON DC 20008 RECEIVING BLDG 3B C-LEVEL						
LINE NO.	FUND	AREA	ORG	SUB ORG	FUNC-TION	OBJ	SUB OBJ	JOB NUMBER	RPTG CATEGORY	AMOUNT
01	413	04	F050		U300	702				40,603.89
02	413	04	F050		U300	702				342.00

LINE NO	ITEM NO	QUANTITY	UNIT	UNIT COST	EXTENDED COST
001	MODEL 82WIN C-V SYSTEM	1.00	EA @	28,722.990	28,722.99
002	MODEL 82-WIN CONSISTING OF 595 QUASISTAT C-V METER 590/100K 1M C-V ANALYZER 230-1 PROGRAMMABLE VOLTAGE SOURCE, 5909 CALIBRATION SOURCE 5951 REMOTE INPUT COUPLER, 5957 SIMULTANEOUS C-V SOFTWARE FOR DOS COMPUTERS AND METRICS-ICS INTERACTIVE CHARACTERIZATION SOFTWARE WITH CV DRIVERS FOR WINDOWS, USER ASSEMBLED AND CONFIGURED.	1.00	EA @	5,756.400	5,756.40
003	MODEL 237 SMU 237 H/V SOURCE MEASURE UNIT DEMO	1.00	EA @	895.500	895.50
004	TEST POINT SOFTWARE PACKAGE	1.00	EA @	1,705.500	1,705.50
005	MODEL 7001 80 CHANNEL SWITCH SYSTEM MAINFRAME	1.00	EA @	2,308.500	2,308.50
006	MODEL 7153 4X5 H/V LOW CURRENT MATRIX CARD	2.00	EA @	607.500	1,215.00
007	MODEL 7153 TRX LOW NOISE M-SERIES TO 3-SLOT TRIAX CABLE	4.00	EA @	85.500	342.00
008	237-BNC-TRX 3 LUG FEMALE TRIAX TO MALE BNC ADAPTER				
MARKED FOR: SIMOX BLDG. 42 RM. 109 ATTN: T. BHAR					
EH PR#30333					

*Grant*  
*Doris M. Andrews*

SEND INVOICES WITH IDENTIFYING PURCHASE ORDER NUMBER TO:  University of D.C. Van Ness Campus Accounting Office Bldg 48/Room 538 4200 Connecticut Avenue, N.W. Washington, D.C. 20008	AGENCY CERTIFICATION I certify that the items herein have been charged to the correct accounting code listed above. These accounting codes are under the jurisdiction of this agency. <i>Sharon Johnson</i> DATE 2/19/98	TOTAL EXTENDED COST 40,945.89
	CERTIFICATE OF ACCEPTANCE INTO FMS I certify that this document was accepted into FMS. DATE ACCEPTED: 2/18/98 BY: <i>Doris M. Andrews</i>	CHECK IF THIS DOCUMENT IS CONTINUED <input type="checkbox"/>

VENDOR COPY



EXHIBIT 3.  
PURCHASE ORDER



GOVERNMENT  
OF THE  
DISTRICT OF COLUMBIA

EXHIBIT 4  
PURCHASE ORDER

(703) 749-4411

DATE OF ORDER	MO DY YR 03 13 98	PURCHASE ORDER ID		TERMS	ORDER PLACED IN ACCORDANCE WITH ALL PROVISIONS OF UDC PROC. REG. CONTRACT NO. QUOT. INVITATION NO. DATED
		TRAN CODE PC	TRAN NUMBER ORD00018595		
TO VENDOR	TYPE C A		VENDOR CODE 1 2 1 4 2 8 0 9 8 4 6		D E L I V E R T O ALL CHARGES PREPAID TO: UNIVERSITY OF DC 4200 CONNECTICUT AVE N.W. WASHINGTON DC 20008 RECEIVING BLDG 38 C-LEVEL
	NAME: COMPUSA ADDRESS: 8357 LEESBURG PIKE VIENNA VA 22182				

LINE NO.	FUND	AREA	ORG	SUB ORG	FUNC-TION	OBJ	SUB OBJ	JOB NUMBER	RPTG CATEGORY	AMOUNT
01	413	04	F050		U300	702				2,989.89

LINE NO	ITEM NO	QUANTITY	UNIT	UNIT COST	EXTENDED COST
001		1.00	EA @	1,924.970	1,924.97
#1811551	- HP 8275 PII300 48/8.0 MT(COMPUTER BUNDLE 818075)				
002		1.00	EA @	624.970	624.97
#159874	- HP 17.28 M70 MM MONITOR (COMPUTER BUNDLE 818075)				
003		1.00	EA @	274.970	274.97
#167014	- HP DESKJET 722C (COMPUTER BUNDLE 818075)				
004		1.00	EA @	34.990	34.99
#147979	- CUSA CBL GOLD IEEE #1284 10				
005	SEE ATTACHE	1.00	EA @	129.990	129.99
#167276	PNY 32MB SDRAM (818075 COMPUTER BUNDLE)				

QUOTE NO. 93980, DATED 02/21/98

MARKED FOR: SIMOX, BLDG.. 42/109, TARAK BHAR

*Carlton E. McLean* 3/18/98  
AUTHORIZED PROCUREMENT SIGNATURE  
PR#30824 AJ

FAXED  
3/18/98

SEND INVOICES WITH IDENTIFYING  
PURCHASE ORDER NUMBER TO:

University of D.C.-Van Ness Campus  
Accounting Office-Bldg 48/Room 538  
4200 Connecticut Avenue, N.W.  
Washington, D.C. 20008

AGENCY CERTIFICATION:

I certify that the items herein have been charged to the correct accounting codes listed above. These accounting codes are under the jurisdiction of this agency.

BY: *[Signature]* DATE:

CERTIFICATE OF ACCEPTANCE INTO PMS

I certify that this document was accepted into PMS:

DATE ACCEPTED: 3/18/98

BY: *[Signature]*

TOTAL EXTENDED COST

2,989.89

CHECK IF THIS  
DOCUMENT IS  
CONTINUED:

PAGE

01  
OF

VENDOR COPY